Let ρ be the perpendicular dropped from the center of the circle on the resultant acceleration PC; α=the angle OPC and PA, the normal acceleration.

Then from the Fig. we have

$$\rho=R\sin\alpha\ldots.(1).$$

From the triangle APC we have

$$\cos\alpha=\frac{AP}{PC}=\frac{V^2}{pR} \text{ or } \alpha=\cos^{-1}\left(\frac{V^2}{pR}\right)\ldots.(2).$$

$$p=\frac{dV}{dt} \text{ or } dV=\rho dt.$$

$$\int_0^V dV=p\int_0^t dt \text{ or } V=pt\ldots.(3).$$

Substituting for V its value in (2) and for α its value in (1) we have

$$\rho=R\sin\left[\cos^{-1}\left(\frac{pt^2}{R}\right)\right]\ldots.(4).$$

$\rho=0$ and the direction of the resultant acceleration is through the center of circle when

$$\cos^{-1}\left(\frac{pt^2}{R}\right)=1 \text{ or when } t=\sqrt{\frac{R}{p}}\,.$$

If it is the tangential acceleration which is constant and$=p$, then

$$\rho=R\sin\left[\tan^{-1}\left(\frac{pt^2}{R}\right)\right]\ldots.(5).$$

PROBLEMS.

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11. Proposed by CHARLES E. MYERS, Canton, Ohio.

"A homogeneous sphere moves down a rough inclined plane, whose angle of inclination θ to the horizon is greater than that of the angle of friction; if the coefficient of friction is less than $\frac{2}{7}$ tang. θ, show that the sphere will roll and slide down the inclined plane."

12. Proposed by J. F. W. SCHEFFER, A. M., Hagerstown, Maryland.

A horizontal plane without weight is supported on three points A, B, C. A weight W is laid upon the table at a point G. If $AG=a$, $BG=b$, $CG=c$, $\angle AGB=\beta$, $\angle AGC,=\gamma$; find the pressures upon A, B, C.

Solutions to these problems should be received on or before July 1st.

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